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Western Lion Landfill
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CERCLA Integrated Site Assessment



**Illinois Environmental
Protection Agency**

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1. INTRODUCTION

In March of 1999, the Illinois Environmental Protection Agency's (Illinois EPA) Site Assessment Program was tasked by the United States Environmental Protection Agency (US EPA) to conduct a CERCLA Integrated Assessment at the Western Lion Landfill located near Mattoon, Illinois. Western Lion was placed on CERCLIS (Comprehensive Environmental Response, Compensation and Liability Act Information System) in March of 1999 as a site discovery. In May of 1999, the Illinois EPA's Site Assessment Program prepared and submitted a work plan for Western Lion to the Region V offices of the US EPA. The sampling portion of the Integrated Assessment was conducted on May 17 and 18, 1999 when the sampling team collected a total of six groundwater and fourteen soil and sediment samples.

The purpose of the Integrated Assessment has developed from US EPA directives and guidance information which outlines Site Assessment program strategies. The information stated in the directive can be seen in Appendix F. The Region V offices of the US EPA have requested that the Illinois EPA identify sites during the Integrated Assessment that may require removal action to remediate an immediate human health and/or environmental threat. On March 31, 1999 Cindy Nolan of the US EPA Region 5 Emergency Response Branch visited the site and determined that the site did not merit a US EPA removal action.

2. SITE BACKGROUND

2.1 SITE DESCRIPTION AND HISTORY

Western Lion Landfill is a 26 acre inactive landfill located 1.5 miles northeast of the city of

Mattoon, near the northwest corner of the intersection of 1100 E (Loxa Road) and 900 N (Route 316). Specifically the site is located in the eastern half of the southeast quarter of Section 2, Township 12 North and Range 8 East of the Third Principal Meridian, in Coles County. The site is immediately west of Loxa Road and the currently operating Coles County Landfill and just south two closed landfills, named Service Area #1 and Service Area #2. A site location map is provided in Figures 1 and 2.

Western Lion Landfill operated from the spring of 1979 until January of 1996. From the time the landfill opened until February, 1983 the landfill operated under the name of Service Area #3 Landfill. In 1983, the landfill was sold and became Western Lion Ltd.. During its time of operation, the landfill received predominantly municipal solid waste with some non-hazardous special wastes from local industries and used a trench fill method.

During an Illinois EPA inspection of the property in May of 1994 it was found that Western Lion had begun the excavation of an unpermitted new trench which truncated the existing trenches, exposing buried refuse. In June of 1994, the Agency sent a letter to Western Lion recommending that this excavation be discontinued immediately and pointed out various regulations and statutory provisions which the action violated. The site's attorney sent a reply that attempted to rebut the facts and claimed that the site was in compliance, and the use of the unpermitted trench was continued. In January of 1996, an agreed order between the State of Illinois' Attorney General's Office and Western Lion Ltd resulted in the cessation of all operations by January 20, 1996. In February, 1996 the site operator, Western Lion Ltd., and the property owner, Service

Disposal Inc., declared bankruptcy. Thus, Western Lion Landfill has been inactive but not properly closed since January, 1996.

The open trench that was created still exists at the site. Over time, this trench has filled with rainwater and leachate from the landfill and contains floating refuse. The trench has unstable side slopes and is estimated to be between 30 to 40 feet deep. Occasionally the pit has overflowed releasing its contents to Riley Creek, which flows in a northerly direction just west of the landfill. To reduce the chance of somebody coming onto the site and falling into the pit, the Illinois EPA had a chain-link fence constructed around the pit area to restrict access. In addition, to temporarily prevent further runoff into the creek, the Illinois EPA had a berm constructed along the northern side of the pit in order to prevent further overflow from being released.

In addition to the open trench problems, the landfill has inadequate cover and has numerous leachate seeps throughout the property. The leachate seeps are located on all sides of the landfill and range in size from very small to very large seeps. The leachate collects in erosion ditches and gullies and then flows into Riley Creek.

The Illinois EPA has a court order against the owner of the landfill to correct the problems at the site, however, he has claimed bankruptcy. Thus, these corrections have not taken place.

3. INTEGRATED ASSESSMENT ACTIVITIES AND ANALYTICAL RESULTS

3.1 INTRODUCTION

This section outlines the procedures utilized and observations made during the CERCLA Integrated Assessment conducted at the Western Lion Landfill. Specific portions of this section contain information pertaining to the reconnaissance inspection and field sampling procedures. Also included in this section is information about the samples that were collected during the Integrated Assessment and a description of the analytical results.

3.2 RECONNAISSANCE INSPECTION

On March 17, 1999, Mr. Peter Sorensen of the Illinois EPA conducted the initial CERCLA Integrated Assessment reconnaissance inspection of Western Lion Landfill. Mr. Sorensen was accompanied by Mr. Kent Johnson of the Illinois EPA's Champaign regional office, who has been in charge of inspecting the landfill for several years. The site reconnaissance included a visual inspection of the site to become familiar with the property, to identify potential sampling locations, and to survey the surrounding land use.

The reconnaissance revealed that the open trench still exists at the site as well as numerous other leachate seeps which are located throughout the landfill property. The open trench is filled with water with garbage floating on top and constantly bubbles as landfill gases seep into it. This trench area is fenced to prevent access. Storm water washouts with exposed weathered refuse are located along the west side of the landfill. Along the south and east sides of the landfill, some deep erosion ravines with exposed refuse are also present. The leachate seeps that exit the

landfill enter the adjacent Riley Creek. During the site reconnaissance these leachate seeps were observed coming out of all sides of the landfill. The leachate from these seeps varied in color and how they had stained the underlying soil. The majority of these seeps come together in a ditch on the northwestern corner of the landfill property and flow into Riley Creek.

3.3 SOIL, SEDIMENT AND GROUNDWATER SAMPLING

Nine soil samples, five sediment and six groundwater samples were collected on the Western Lion Landfill property during the May, 1999 Integrated Assessment sampling event. The nine soil samples were all collected from areas where leachate exits the sides of the landfill or from ditches where this leachate flows and collects to determine whether hazardous substances are exiting the landfill. The five sediment samples were collected from Riley Creek to help determine whether it has been impacted by the landfill. One sample was collected upstream of the landfill as a background sample and four were collected alongside or downstream of the landfill. The locations of the soil and sediment samples can be seen in Figures 4 and 5 and a sample description can be seen in Table 1.

Groundwater samples were collected from four monitoring wells that surround the landfill and from one residential drinking well. The monitoring wells that were sampled were located basically at each of the four corners of the landfill. The residential well that was sampled was located approximately one-quarter mile to the north of the landfill. The locations of these samples can be seen on Figure 5.

3.4 ANALYTICAL RESULTS

The samples collected during the Western Lion Landfill Integrated sampling event were analyzed for U.S. EPA Target Compound List compounds (see Appendix D) and a quality assurance review of the sample analysis was performed by Lockheed, Environmental Science Assistance Team Contractor for U.S. EPA Region V. A final quality assurance review of the data packages was subsequently performed by the staff of the Central Regional Laboratories of U.S. EPA Region V. The volatile organics portion of the groundwater samples was analyzed by Rollins Environmental Incorporated while the semi-volatiles and pesticides/PCBs portion for groundwater and soils/sediments was analyzed by American Analytical and Technical Services. The inorganics portion of the samples for both soils/sediments and groundwater was analyzed by Southwest Labs of Oklahoma. Complete laboratory analytical data for the samples are provided in Appendix G of this report.

3.5 Key Samples

Key samples are samples in which contaminants were detected at levels three times or greater above background. The groundwater samples were compared to sample G103, which was considered background. The groundwater samples did not contain any volatiles, semi-volatiles or pesticides with concentrations three times above background but did contain several inorganics that did. These inorganics include aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium and zinc. Table 5 shows the analytical results for the key groundwater samples.

The sediment samples were compared to background sample X201, which was collected upstream of the landfill. The semi-volatiles carbazole, fluoranthene, chrysene, bis (2-ethylhexyl) phthalate and benzo (g, h, i) perylene and the inorganics calcium and magnesium were found at concentrations greater than three times background levels. The analytical results for these key samples can be seen on Table 4. None of sediment sample concentrations found at levels three

times above background exceeded sediment ecological benchmarks. These ecological benchmarks are explained in Section 5.3 of this report.

4. IDENTIFICATION OF SOURCES

4.1 LANDFILL

As stated earlier, Western Lion Landfill is a 26 acre inactive landfill which operated from the spring of 1979 until January of 1996. During its time of operation, the landfill received predominantly municipal solid waste with some non-hazardous special wastes from local industries and used a trench fill method. In May of 1994 it was found that Western Lion had illegally begun the excavation of an unpermitted new trench which truncated the existing trenches, exposing buried refuse.

The open trench that was created still exists at the site. Over time, this trench has filled with rainwater and leachate from the landfill and contains floating refuse. In addition to the open trench problems, the landfill has inadequate cover and deep erosion ravines with exposed refuse are present throughout the landfill. In addition, numerous leachate seeps exit the landfill throughout the site.

Nine soil samples were collected from the Western Lion Landfill property. These were collected from areas where leachate seeps had stained the soils and from areas where numerous leachate seeps collected in ditches. The analytical results from these samples were compared to Illinois EPA's TACO remediation objectives for soils on non-residential industrial/commercial properties. When compared to these, five of the nine soil samples collected were found to exceed the remediation objectives for arsenic and one for benzene. These analytical results are discussed in greater detail in Section 5.5.

Western Lion Landfill has been inactive but not properly closed since January, 1996. No proper

liner or cap exists on the landfill. The landfill is closed off to the public and there are no indications that the property is used for recreational purposes.

5. MIGRATION PATHWAYS

5.1 INTRODUCTION

The CERCLA Site Assessment Program identifies three migration pathways and one exposure pathway by which hazardous substances may pose a threat to human health and/or the environment. Consequently, sites are evaluated on their known or potential impact to these four pathways. The pathways evaluated are groundwater migration, surface water migration, air migration and soil exposure. The following section discusses these pathways and the site's impact or potential impact on them and on the various human and environmental targets. These targets include human populations, fisheries, endangered species, wetlands and other sensitive environments.

5.2 Groundwater Pathway

In 1994, Rapps Engineering and Applied Science, Inc. conducted a hydrogeologic investigation at Western Lion Landfill. According to this report the geology in the Western Lion vicinity generally consists of unconsolidated glacial drift deposits on top of bedrock. The drift is about 50 to 70 feet in depth across the site with the groundwater table 5 to 10 feet below the ground surface. Local shallow groundwater is thought to follow the surface drainage towards Riley Creek.

Several farm houses are located within one-half mile of the landfill, but most of these do not obtain their water supply from their own wells but rather from a rural supplied water line. Only one household was located that uses a private well for their water supply, and this well was sampled. Four monitoring wells that surround the landfill were also sampled during the Western Lion sampling event.

The four monitoring wells that were sampled are basically located at the four corners of the landfill (see Figure 5 for well locations). Samples G101 and G102 were duplicate samples that were collected from a monitoring well located at the southeast corner of the landfill. The depth of this well is 47 feet and water was found at a depth of 17 feet. Sample G103 was collected from a monitoring well located at the northeast corner of the landfill. The depth of this well is 42 feet and water was found at a depth of four and a half feet. The monitoring well sampled for G104 is located at the southwest corner of the landfill and is 56.5 feet deep with a water depth of 20.5 feet. The monitoring well sampled for G105 is located at the northwest corner of the landfill and is 48 feet deep with a water depth of 13 feet.

The analytical results obtained from these monitoring wells were compared to Illinois EPA Class II groundwater standards found in 35 IL Adm. Code Part 620 and the groundwater objectives found in Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO) document. None of the monitoring wells sampled exceeded groundwater standards for volatile or semi-volatile compounds or for pesticides or PCBs. The samples did exceed some remediation objectives, however, for the inorganic contaminants iron, barium and lead. The table below shows the analytical results for the samples that exceeded these benchmarks with the concentrations in parts per billion (ppb).

	Class II benchmark	G101	G102	G103	G104	G105
iron	5000	97,900	405,000	13,000	30,100	13,300
barium	2000	--	--	--	--	2640
lead	100	--	171	--	--	--

In addition to collecting monitoring well samples, one groundwater sample (G201) was collected from a well at a private residence located approximately a quarter-mile north of the landfill. This

sample was found to exceed the drinking water standards for one contaminant, which was barium. The drinking water standard for barium is 2000 ppb while the concentration found in the well was 3680 ppb. Barium is a contaminant that can either be naturally occurring in groundwater from rock formations containing barium or can be from sources such as landfills. One monitoring well (G105) sampled at Western Lion was found to contain barium at levels exceeding groundwater benchmarks, although it was at a level lower than what was found in the residential well. It is unclear whether the barium in the residential well is naturally occurring or the result of the presence of Western Lion Landfill or the other landfills in the immediate vicinity. The results from the residential well have been given to the Coles County Department of Public Health for their review.

5.3 Surface Water Pathway

Surface water and leachate from the Western Lion Landfill flow into a series of erosion ditches which collect on the northwest corner of the property in a large erosion ditch. From here, the surface water flows directly into Riley Creek which runs along the northwest corner of the landfill property. Riley Creek flows approximately ten miles to the southeast where it enters the Embarras River. Both Riley Creek and the Embarras River are used for recreational fishing. Forested wetlands exist along Riley Creek within a quarter-mile of where the leachate enters the creek.

Sediment samples were collected upstream (X201) and downstream (X202 - X205) of the landfill to help determine whether the landfill has impacted Riley Creek. See Figure 5 for the

locations of these samples. The samples collected downstream of the landfill contained several contaminants at levels greater than three-times the concentrations of the upstream sample. These included the semi-volatiles carbazole, fluoranthene, chrysene, bis (2-ethylhexyl) phthalate and benzo (g, h, i) perylene and the inorganics calcium and magnesium. Of these contaminants, none were found at levels exceeding ecological benchmarks (discussed below).

The sediment samples collected during the sampling event were compared to ecological benchmarks to help determine whether site activities have impacted the surface water pathway. Two sources of benchmarks were used for this comparison: Ontario sediment quality guidelines and US EPA ecotoxicological (ecotox) thresholds. Ontario sediment quality guidelines are non-regulatory ecological benchmark values that serve as indicators of potential aquatic impacts. Levels of contaminants below Ontario benchmarks indicate a level of pollution which has no effect on the majority of the sediment-dwelling organisms. Contaminants for which no Ontario benchmarks were available were compared to US EPA ecotox thresholds. Ecotox thresholds are ecological benchmarks above which there is sufficient concern regarding adverse ecological effects to warrant further site investigation. Ecotox thresholds are to be used for screening purposes and are not regulatory criteria, site-specific cleanup standards or remediation goals.

The samples collected downstream of the landfill did not contain any volatiles, semi-volatiles, pesticides or PCBs exceeding ecological benchmarks. They did, however, contain the inorganics arsenic, copper, iron and nickel exceeding these levels. The table below shows the samples that exceeded the benchmarks and the concentrations of the metals found in parts per million (ppm).

	Ecological Benchmark	X201 Background	X202	X203	X204	X205
arsenic	6	6.9	8.4	--	8.2	12.9
copper	16	14.5	17	25.7	21.6	--
iron	20000	17800	23700	--	--	--
nickel	16	15.8	20.8	16.2	23.5	--

Although the sediment samples do not indicate high levels of contamination, the surface water pathway is still considered to be of concern. This is because Riley Creek is a high quality creek and is receiving leachate directly from Western Lion Landfill. A sample that was collected from the ditch that flows directly into Riley Creek (X103), was found to contain elevated levels of benzene which is a constituent of gasoline. This is an indication that contaminated leachate has left the landfill and entered the creek.

5.4 Air Pathway

Western Lion Landfill was never properly closed and does not have an adequate cover on top of the wastes. During the site reconnaissance and the sampling event, landfill gases (methane) were observed exiting the landfill. These were seen bubbling up through some of the leachate seeps as well as in the water in the open trench. Because of the release of these gases as well as an inadequate cover over the refuse, at times, the landfill smells badly. Although this can be a nuisance, it is not thought at this time that this is a health hazard to the people of the area. The nearest residences are within a quarter-mile of the site.

5.5 Soil Exposure

Nine soil samples were collected from the Western Lion Landfill property. These were collected from areas where leachate seeps had stained the soils and from areas where numerous leachate seeps collected in ditches. The samples were collected in these areas because they were thought to be the areas most likely to show signs of contamination if hazardous substances were exiting the landfill in the leachate. The locations of these samples can be seen in Figure 4.

The analytical results from these samples were compared to Illinois EPA's TACO remediation objectives for soils on non-residential industrial/commercial properties. When compared to these, five of the nine soil samples collected were found to exceed the remediation objectives for arsenic. The remediation objective for arsenic is 5.2 ppm while the soils on the landfill exceeding the objectives ranged from six to eleven ppm. Arsenic levels in Illinois are naturally at a high level and these results are most likely the result of these natural occurring levels rather than contamination from the landfill.

Only one of the nine soil samples exceeded remediation objectives for a contaminant other than arsenic. Soil sample X103 was found to exceed the remediation objectives for benzene, which is a constituent of gasoline. This sample was collected from a point where many of the leachate seeps from the landfill collect prior to entering Riley Creek and is an indication that leachate containing gasoline products has left the landfill and entered the creek.

The landfill is closed off to the public and there are no indications that the property is used for

recreational purposes. Due to this and the fact that only low levels of contaminants were generally found on-site, the soil exposure pathway is not considered to be of concern at this time.

Appendix A

Figures

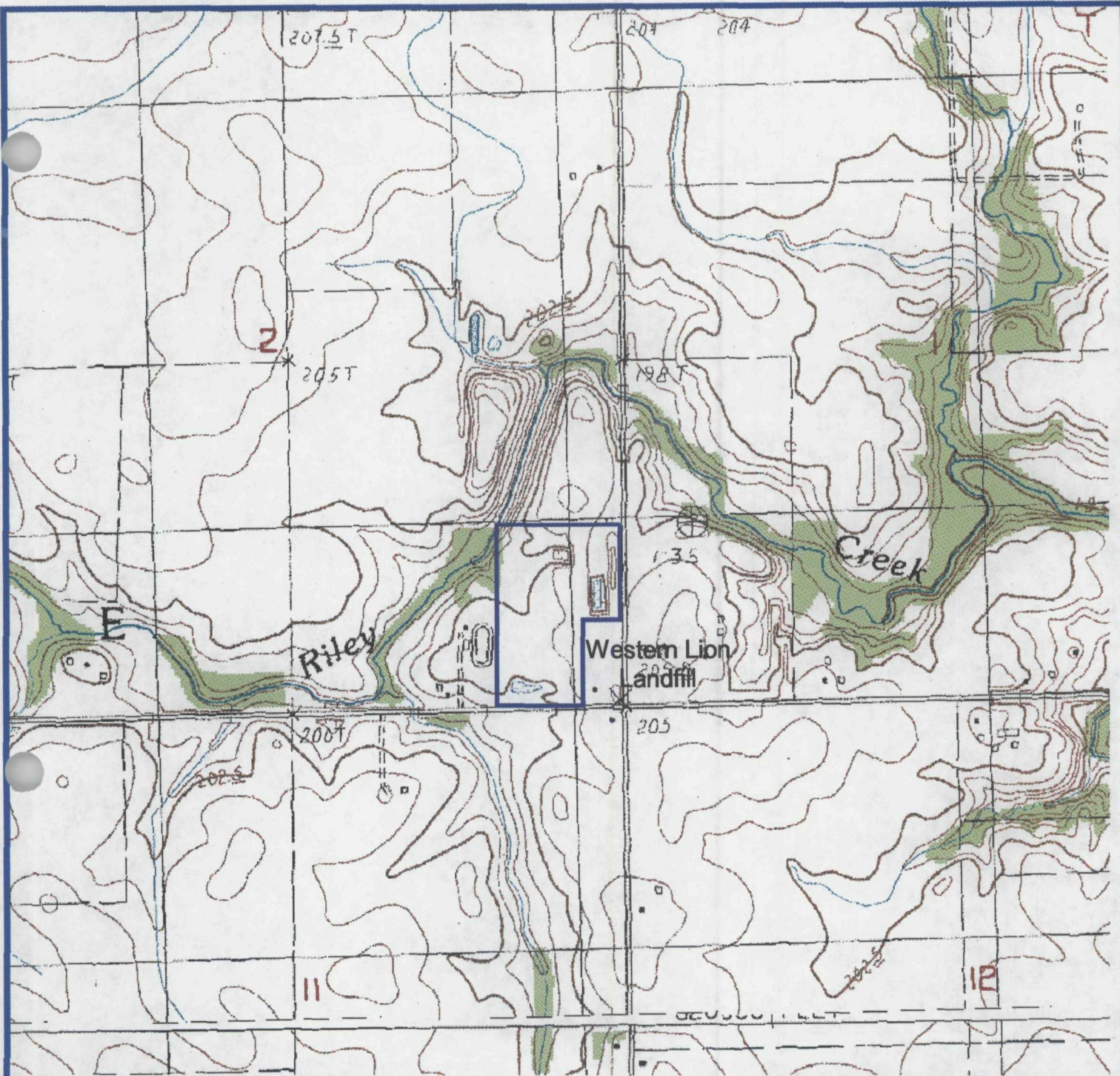


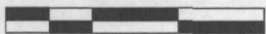
Figure 2

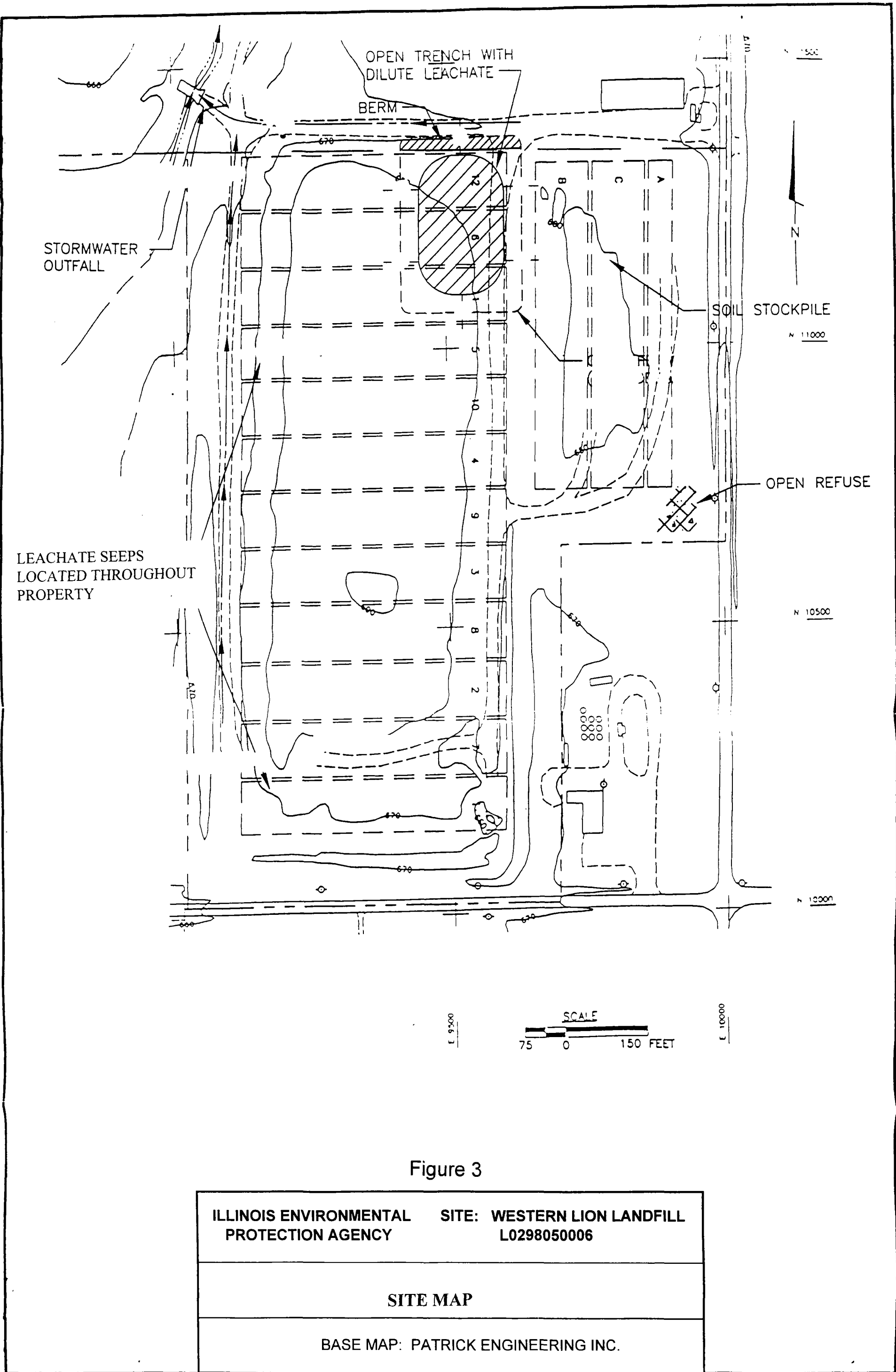
Western Lion Landfill

Site Location Map



500 0 500 1000 Feet





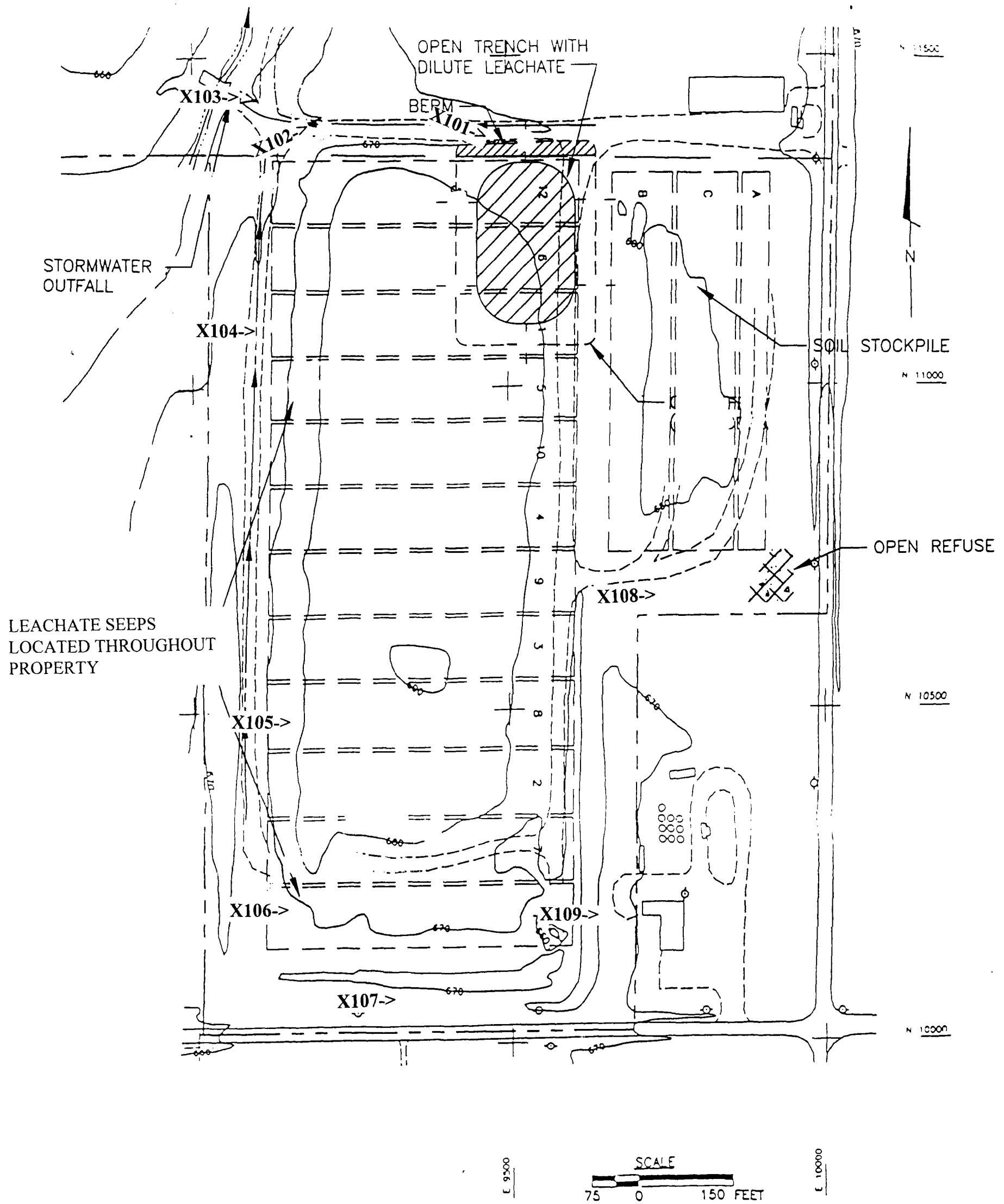
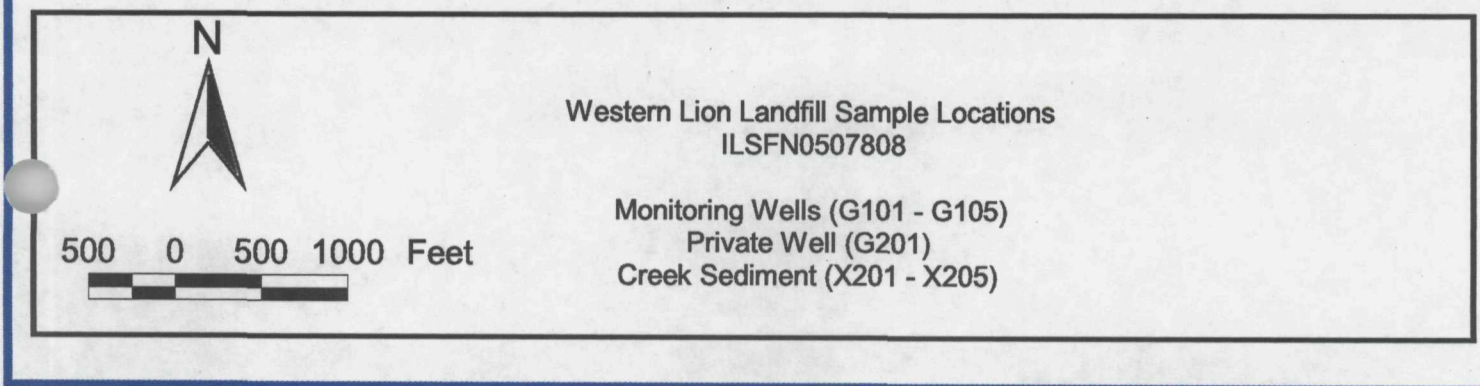


Figure 5



Appendix B

Tables

Table 1**CERCLA Integrated Site Assessment Sample Descriptions**

Sample	Depth	Appearance	Location
X101	0 - 2"	Brown silt.	Erosion ditch where overflow from the open pit flows.
X102	0 - 2"	Brown silt.	Erosion ditch where leachate seeps on the north side of the landfill collect.
X103	0 - 2"	Brown silt.	Erosion ditch where leachate seeps on the north and west sides of the landfill collect.
X104	0 - 2"	Brown silt with red staining.	Erosion ditch where leachate seeps on the west side of the landfill collects.
X105	0 - 2"	Brown silt.	Erosion ravine on the west side of the landfill where a major leachate seep flows.
X106	0 - 2"	Brown silt with red and green staining.	Low area that collects leachate from the southwest, south and east sides of the landfill.
X107	0 - 2"	Brown silt.	Low area that collects leachate from the south and east sides of the landfill.
X108	0 - 2"	Brown silt.	Low area that collects leachate from the east side of the landfill.
X109	0 - 2"	Brown silt.	Low area that collects leachate from the east side of the landfill.
X201	0 - 6"	Brown silt with gray clay.	Upstream of landfill.
X202	0 - 6"	Brown silt with gray clay.	Alongside the landfill.
X203/X204	0 - 6"	Black silt with gray clay and some sand.	Just downstream of the landfill.
X205	0 - 6"	Black silt with sand.	Farther downstream of the landfill.

Table 2
Western Lion Landfill Soil and Sediment Sample Results

SAMPLING POINT Date Collected PARAMETER	TACO Tier 1 Remediation Objectives	X101	X102	X103	X104	X105	X106	X107	X108	X109	Ecotox Biomk.	X201	X202	X203	X204	X205
Volatiles (in ug/kg)																
Acetone	16000.0	59.0 JB	67 JE	98 JB	42 JB	66 JB	96 BJ	71 BJ	53 BJ	18.0 BJ		89 BJ	33 BJ	45 BJ	47 BJ	36 BJ
Carbon disulfide	9000.0	9.0 J				12 J	23 J	3 J		4.0 J			47 J	5 J	11 J	38 J
2-Butanone																
Benzene	30.0	8.0 J	3 J	610 E		6	4 J	4 J	14 J	4.0 J	57		4 J		4 J	
Toluene	12000.0	22.0					11	7	5 J	6.0	678	4 J	6 J			
Chlorobenzene	1000.0		10	11							829			8	7	
Ethylbenzene	13000.0	9.0 J		17			27			2.0 J	3696					
m- &/or p- Xylene	150000.0	8.0 J		7 J		4 J	110	3 J		4.0 J	25					
o-Xylene	190000.0						48									
Isopropylbenzene				13					6							
tert-Butylbenzene			3 J	58												
1,2,4-Trimethylbenzene							5 J									
p-Isopropyltoluene							3 J									
1,4-Dichlorobenzene	2000.0										350			8	7	
Naphthalene	84000.0						4 J				160					
Semi-Volatiles (in ug/kg)																
1,4-Dichlorobenzene	2000.0										480				26.0 J	
Acenaphthylene		63.0 J		37 J												
Acenaphthene	570000.0	59.0 J									620					
Fluorene	560000.0	49.0 J									540					
Phenanthrene		550.0		90 J		55 J	100 J	150 J	260 J	280.0 J	850				50.0 J	24.0 J
Anthracene	12000000.0	160.0 J							52.0 J	64.0 J						
Carbazole	600.0	57.0 J														
Fluoranthene	4300000.0	860.0		100 J		71 J	160 J	300 J	420	540.0	2900				75.0	51.0
Pyrene	4200000.0	660.0		25 J		72.0 J	140.0 J	240.0 J	390.0	360.0	660	61.0 J		62.0	62.0	54.0
Butylbenzylphthalate	930000.0	76.0			54 J		75.0 J	48.0 J	45.0 J	48.0 J					47.0	
Benzo(A) anthracene	2000.0	480.0				34 J	92 J	120 J	210 J	290.0 J		32.0 J			42.0	28.0
Chrysene	160000.0	460.0		52 J		41.0 J	80.0 J	160.0 J	200.0 J	290.0 J					47.0	33.0
bis(2-Ethylhexyl)Phthalate	410000.0	230.0 J		100 J			250 J	58 J	140 J	53.0 J		70.0 J	160.0 J	310.0 J	630.0 J	54.0 J
Benzo(b)Fluoranthene	5000.0	440.0		58 J		36.0 J	71.0 J	120.0 J	200.0 J	310.0 J					53.0 J	42.0 J
Benzo(k)Fluoranthene	49000.0	310.0 J		25 J		37 J	68 J	130 J	160 J	200.0 J					43.0 J	32.0 J
Benzo(a)Pyrene	800.0	450.0		45 J		33.0 J		130.0 J	200.0 J	290.0 J	430				47.0 J	31.0 J
Indeno(1,2,3-cd)Pyrene	8000.0	310.0 J						110 J	160 J	250.0 J						
Dibenz(a,h)Anthracene	800.0	74.0 J														
Benzo (g,h,i)Perylene		240.0 J				20 J		96 J	130 J	180.0 J						
Pesticides/PCBs																
None detected.											ug/kg					
Inorganics (in mg/kg)																
Aluminum		5210.0	9750	10700	21400	10100	8950	10400	7440	5760.0		9540.0	11900.0	10300.0	10300.0	3250.0
Antimony	5.0				1.1 B			0.7 B								
Arsenic	5.2	5.2	4.5	8.1	11	6	6.4	6.8	5.1	4.2	6	6.9	8.4	5.6	8.2	12.9
Barium	1200.0	62.4	93.6	68.2	137	58.4	70.4	61.2	43.4 B	43.9		124.0	87.8	99.7	122.0	40.2 B
Beryllium	1.0	0.3 B	0.6 B	0.61 B	0.98 B	0.51 B	0.52 B	0.55 B	0.43 B	0.3 B		0.6 B	0.7 B	0.5 B	0.6 B	
Cadmium	3.7										0.6					
Calcium		37200.0	6880	22100	5330	26200	33800	39900	52800	35200.0		4710.0	28500.0	21200.0	15900.0	3740.0
Chromium	46.0	11.3	13.4	16.6	24.6	13.9	13.7	14.8	12.2	9.3		14.4	19.3	23.8	18.8	5.4
Cobalt	12000.0	5.1 B	6.9 B	9 B	13.6	7.0 B	7.7 B	9.7 B	7.4 B	6.6 B	50	11.9 B	10.1 B	6.7 B	7.6 B	12.6 B
Copper	8200.0	17.4	17	14.5	19.8	11.9	14.2	13.1	11.4	8.5	16	14.5	17.0	25.7	21.6	6.6 B
Iron		11200.0	15200	21000	30600	16000	18400	17000	13900	11000.0	20000	17800.0	23700.0	14700.0	17800.0	9980.0
Lead	400.0	17.2	13.2	17.7	20.5	10.2	12.2	11.5	11.5	8.2	31	22.5	14.9	21.1	25.3	9.8
Magnesium		10700.0	4380	9220	5420	13000	16200	20700	24100	16100.0		3280.0	12900.0	11300.0	8940.0	2080.0
Manganese	8700.0	378.0	439	586	686	501.0	503.0	523.0	584.0	403.0	460	755.0	547.0	258.0	295.0	96.1
Mercury	0.2										0.2					
Nickel	76.0	12.0	17.1	17.2	26.1	18.0	18.6	20.3	15.2	13.1	16	15.8	20.8	16.2	23.5	8.4 B
Potassium		1100.0 B	1100 B	1460	1610	1440	1960	1820	1750	1110.0		1140.0 B	2000.0	1460.0	1310.0	388.0 B
Selenium	8.8															
Silver	1.5										0.5					
Sodium		358.0 B	417 B	473 B	502 B	385.0 B	1160.0 B	560.0 B	525.0 B	330.0 B		338.0 B	451.0 B	370.0 B	376.0 B	272.0 B
Thallium	160.0															
Vanadium	1400.0	13.1	21.4	27.6	41.2	22	20.2	21.6	16	12.9		27.0	28.4	22.2	28.8	12.2 B
Zinc	61000.0	61.7	49.3	52.6	66	40.7	55.2	44.5	40.6	27.8		58.2	66.1	55.3	65.0	26.2
Cyanide	40.0	0.1 B	0.32 B	0.26 B	0.8	0.1 B	0.3 B		0.2 B		120	0.3 B		0.2 B	0.2 B	0.1 B

Table 3

Western Lion Landfill Groundwater Sample Results

SAMPLING POINT PARAMETER	TACO Class II Remediation Objectives	G101 monitoring well	G102 monitoring well	G103 monitoring well	G104 monitoring well	G105 monitoring well	Drinking Water Standards	G201 residential well
Volatiles (in ug/l)								
None detected.								
Semi-volatiles (in ug/l)								
Diethylphthalate bis(2-Ethylhexyl)Phthalate	60	1 J 0.8 JB	2 J 1 JB	0.8 JB	0.8 JB	1.0 JB	6	
Pesticides (in ug/l)								
None detected.								
Inorganics (in ug/l)								
Aluminum		57700	207000	7580	15000	5320		30.9 B
Antimony	24	4.3 B	13.7 B		3.4 B		6	
Arsenic	200	31.3	94.4	5.2 B	34.9	104	50	17.3
Barium	2000	554	1610	129 B	554.0	2640.0	2000	3680.0
Beryllium	500	3.1 B	12.1				4	
Cadmium	50		1.1 B				5	1.9 B
Calcium		304000	1010000	144000	236000	101000		31200
Chromium	1000	159	501	30.7	20.2	8.3 B	100	
Cobalt	1000	43.2 B	178	5.3 B	16.3 B	4.1 B	1000	
Copper	650	107	375	82.3	20.7 B	11.9 B	650	37.6
Iron	5000	97900	405000	13000	30100	13300	5000	1090
Lead	100	46.6	171	3.9	14.7	9.1	7.5	
Magnesium		150000	431000	76900	101000	64400		20300
Manganese	10000	2270	8370	545	3670.0	235.0	150	24.3
Mercury	10		0.23				2	
Nickel	2000	154	541	20.2 B	29.9 B	10.1 B	100	
Potassium		16800	40300	3980 B	4060 B	3770 B		2200 B
Selenium	50						50	
Silver							50	
Sodium		56700	63800	16600	17200.0	49700.0		196000.0
Thallium	20	7.3 B	12.1				2	
Vanadium		107	365	12.9 B	26.3 B	10.9 B	49	
Zinc	10000	260	1030	42	82.3	30.3	5000	427
Cyanide	600	4.2 B	4 B	4 B	3.9 B	3.6 B	200	2.3 B

Table 4
Western Lion Landfill Key Sediment Samples

SAMPLING POINT Date Collected PARAMETER	Ecotox. benchmark	X201 Background	X202	X203	X204	X205
Semi-Volatiles (in ug/kg)						
Carbazole	2900	--	--	--	75.0	51.0
Fluoranthene		--	--	--	78.0	54.0
Chrysene		--	--	--	47.0	33.0
bis(2-Ethylhexyl)Phthalate		70.0 J	--	310.0 J	630.0 J	--
Benzo (g,h,i)Perylene						
Inorganics (in mg/kg)						
Calcium		4710.0	28500.0	21200.0	15900.0	--
Magnesium		3280.0	12900.0	11300.0	--	--

Table 5
Western Lion Landfill Groundwater Key Samples

SAMPLING POINT PARAMETER	TACO Class II Remediation Objectives	G103 background monitoring well	G101 monitoring well	G102 monitoring well	G104 monitoring well	G105 monitoring well	Drinking Water Standards	G201 residential well
Inorganics (in ug/l)								
Aluminum		7580	57700	207000				
Arsenic	200	5.2 B	31.3	94.4	34.9	104	50	17.3
Barium	2000	129 B	554	1610	554.0	2640.0	2000	3680.0
Chromium	1000	30.7	159	501			100	
Cobalt	1000	5.3 B	43.2 B	178	16.3 B		1000	
Copper	650	82.3		375			650	
Iron	5000	13000	97900	405000			5000	
Lead	100	3.9	46.6	171	14.7		7.5	
Magnesium		76900		431000				
Manganese	10000	545	2270	8370	3670.0		150	
Nickel	2000	20.2 B	154	541			100	
Potassium		3980 B	16800	40300				
Sodium		16600	56700	63800	17200.0	49700.0		196000.0
Vanadium		12.9 B	107	365			49	
Zinc	10000	42	260	1030			5000	427

Appendix C

Site Characteristics Data Form

PREscore 4.0
NPL Characteristics Data Collection Form

PAGE: 1

Record Information

1. Site Name: Western Lion Landfill
(as entered in CERCLIS)
2. Site CERCLIS Number: 980824874
3. Site Reviewer: Peter Sorensen
4. Date: 9-15-99
5. Site Location: Mattoon, Coles Co., IL
(City/County,State)
6. Congressional District:
7. Site Coordinates: Single

Latitude:

Longitude:

Site Description

1. Setting: Rural
2. Current Owner: Private - Individual
3. Current Site Status: Inactive
4. Years of Operation: Inactive Site, from and to dates: 1979 - 1996
5. How Initially Identified: State/Local Program
6. Entity Responsible for Waste Generation:
 - Landfill
 - Municipal
7. Site Activities/Waste Deposition:
 - Municipal Landfill

Waste Description

8. Wastes Deposited or Detected Onsite:

- Municipal Waste

Response Actions

9. Response/Removal Actions:

- Site Access Has Been Restricted

RCRA Information

10. For All Active Facilities, RCRA Site Status:

- Not Applicable

Demographic Information

11. Workers Present Onsite: No

12. Distance to Nearest Non-Worker Individual: > 10 Feet - 1/4 Mile

13. Residential Population Within 1 Mile: Unknown

14. Residential Population Within 4 Miles: Unknown

Water Use Information

15. Local Drinking Water Supply Source:

- Ground Water (within 4 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: Unknown

17. Drinking Water Supply System Type for Local Drinking
Water Supply Sources:

- Unknown

18. Surface Water Adjacent to/Draining Site:

- Stream

Appendix D

Target Compound List

TARGET COMPOUND LIST

Volatile Target Compounds

Chloromethane	1,2-Dichloropropane
Bromomethane	cis-1,3-Dichloropropene
Vinyl Chloride	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride	1,1,2-Trichloroethane
Acetone	Benzene
Carbon Disulfide	trans-1,3-Dichloropropene
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroethene (total)	2-Hexanone
Chloroform	Tetrachloroethene
1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
2-Butanone	Toluene
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethylbenzene
Vinyl Acetate	Styrene
Bromodichloromethane	Xylenes (total)

Base/Neutral Target Compounds

Hexachloroethane	2,4-Dinitrotoluene
bis(2-Chloroethyl) Ether	Diethylphthalate
Benzyl Alcohol	N-Nitrosodiphenylamine
bis (2-Chloroisopropyl) Ether	Hexachlorobenzene
N-Nitroso-Di-n-Propylamine	Phenanthrene
Nitrobenzene	4-Bromophenyl-phenylether
Hexachlorobutadiene	Anthracene
2-Methylnaphthalene	Di-n-Butylphthalate
1,2,4-Trichlorobenzene	Fluoranthene

Isophorone	Pyrene
Naphthalene	Butylbenzylphthalate
4-Chloroaniline	bis(2-Ethylhexyl)Phthalate
bis(2-chloroethoxy)Methane	Chrysene
Hexachlorocyclopentadiene	Benzo(a)Anthracene
2-Chloronaphthalene	3-3'-Dichlorobenzidene
2-Nitroaniline	Di-n-Octyl Phthalate
Acenaphthylene	Benzo(b)Fluoranthene
3-Nitroaniline	Benzo(k)Fluoranthene
Acenaphthene	Benzo(a)Pyrene
Dibenzofuran	Ideno(1,2,3-cd)Pyrene
Dimethyl Phthalate	Dibenz(a,h)Anthracene
2,6-Dinitrotoluene	Benzo(g,h,i)Perylene
Fluorene	1,2-Dichlorobenzene
4-Nitroaniline	1,3-Dichlorobenzene
4-Chlorophenyl-phenylether	1,4-Dichlorobenzene

Acid Target Compounds

Benzoic Acid	2,4,6-Trichlorophenol
Phenol	2,4,5-Trichlorophenol
2-Chlorophenol	4-Chloro-3-methylphenol
2-Nitrophenol	2,4-Dinitrophenol
2-Methylphenol	2-Methyl-4,6-dinitrophenol
2,4-Dimethylphenol	Pentachlorophenol
4-Methylphenol	4-Nitrophenol
2,4-Dichlorophenol	

Pesticide/PCB Target Compounds

alpha-BHC	Endrin Ketone
beta-BHC	Endosulfan Sulfate
delta-BHC	Methoxychlor
gamma-BHC (Lindane)	alpha-Chlordane
Heptachlor	gamma-Chlordane
Aldrin	Toxaphene
Heptachlor epoxide	Aroclor-1016
Endosulfan I	Aroclor-1221
4,4'-DDE	Aroclor-1232
Dieldrin	Aroclor-1242
Endrin	Aroclor-1248
4,4'-DDD	Aroclor-1254
Endosulfan II	Aroclor-1260
4,4'-DDT	

Inorganic Target Compounds

Aluminum	Manganese
Antimony	Mercury
Arsenic	Nickel
Barium	Potassium
Beryllium	Selenium
Cadmium	Silver
Calcium	Sodium
Chromium	Thallium
Cobalt	Vanadium
Copper	Zinc
Iron	Cyanide
Lead	Sulfide
Magnesium	

Appendix E

IL EPA Site Photographs

Date: 5/17/99

Time: 1:45 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X101

Photo Direction: north



Date: 5/17/99

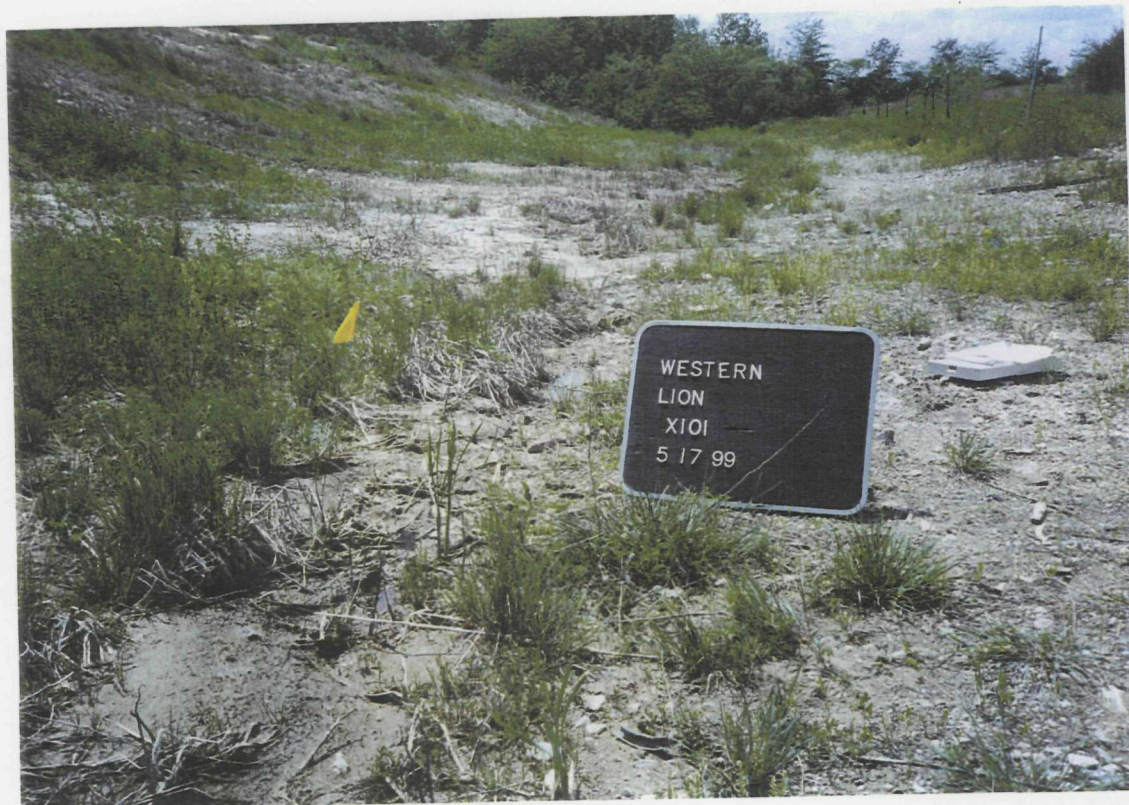
Time: 1:45 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X101

Photo Direction: west



Date: 5/17/99

Time: 2:00 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X102

Photo Direction: south



Date: 5/17/99

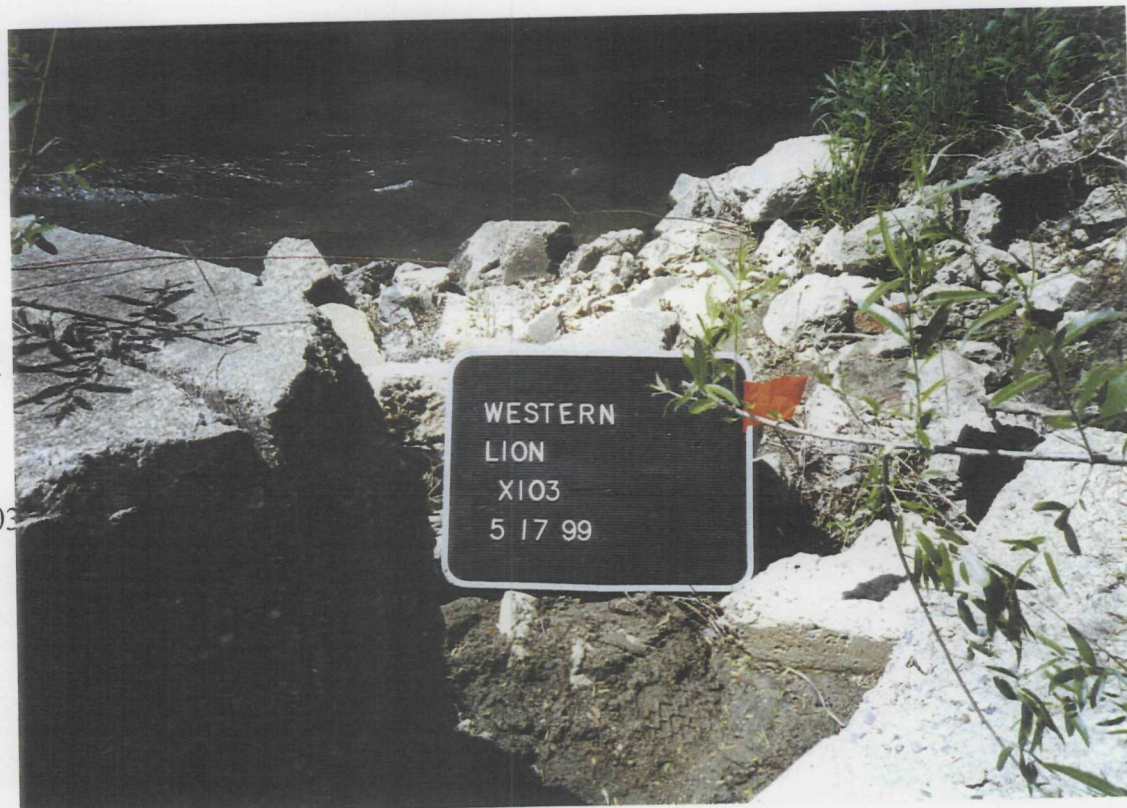
Time: 2:15 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X103

Photo Direction: east



Date: 5/17/99

Time: 3:00 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X104

Photo Direction: north



Date: 5/17/99

Time: 3:00 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X104

Photo Direction: east



Date: 5/17/99

Time: 3:30 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X105

Photo Direction: north



Date: 5/17/99

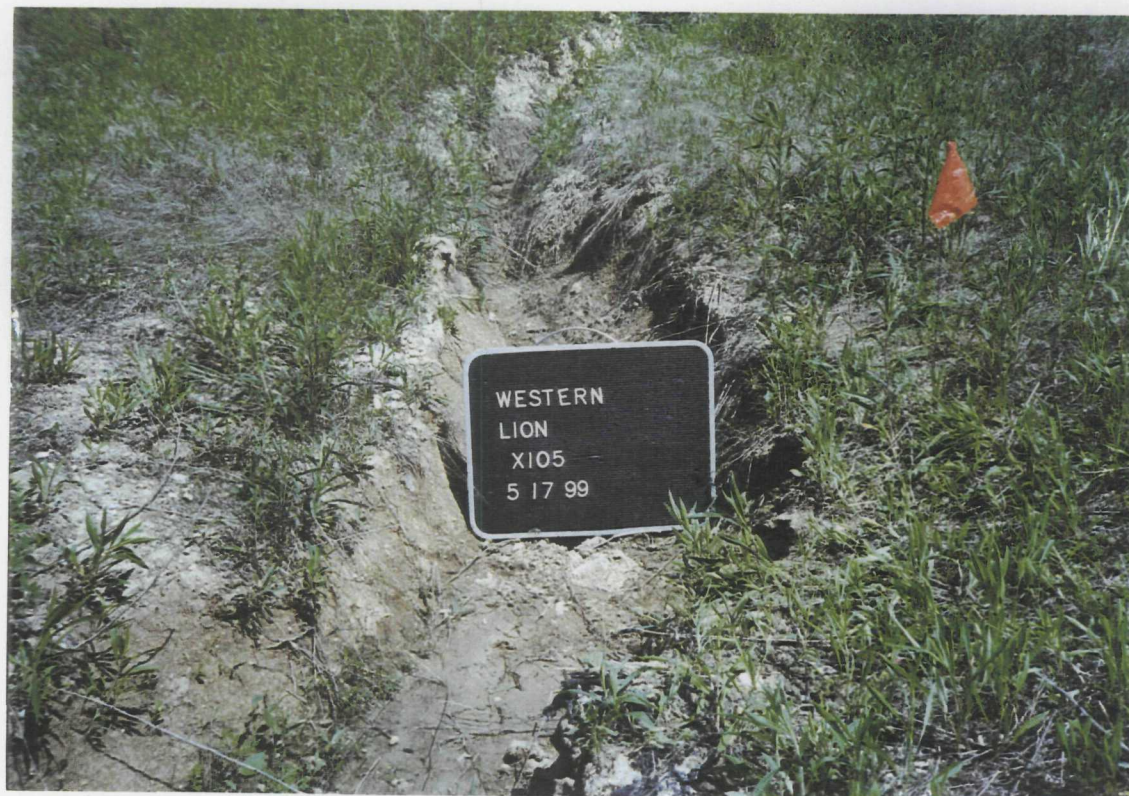
Time: 3:30 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X105

Photo Direction: east



Date: 5/17/99

Time: 3:45 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X106

Photo Direction: north



Date: 5/17/99

Time: 3:45 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X106

Photo Direction: east



Date: 5/17/99

Time: 4:15 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X107

Photo Direction: south



Date: 5/17/99

Time: 4:15 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X107

Photo Direction: west



Date: 5/18/99

Time: 10:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: X108



Date: 5/18/99

Time: 10:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: X108



Date: 5/18/99

Time: 10:40 am

Western Lion Landfill

ILSFNO507808

Sample Location: X109

Photo Direction: north



Date: 5/18/99

Time: 10:40 am

Western Lion Landfill

ILSFNO507808

Sample Location: X109

Photo Direction: west



Date: 5/18/99

Time: 12:15 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X202

Photo Direction: south



Date: 5/18/99

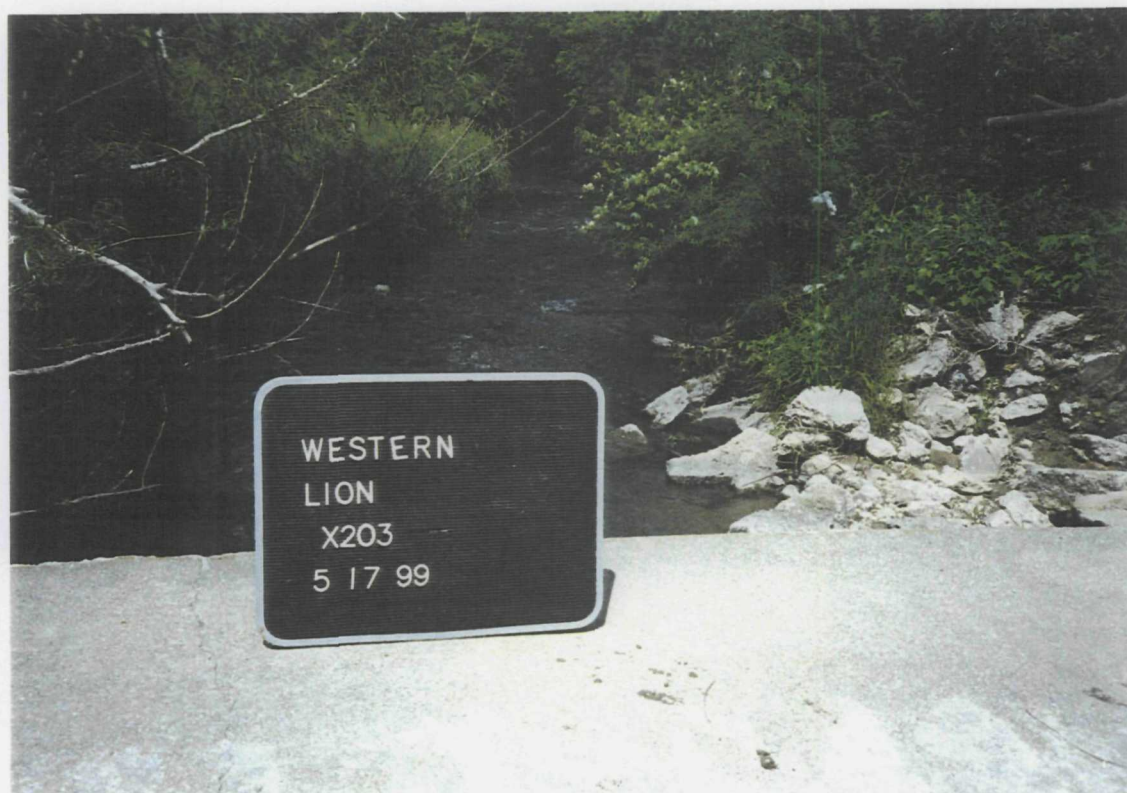
Time: 11:50 am

Western Lion Landfill

ILSFNO507808

Sample Location: X203/X204

Photo Direction: north



Date: 5/17/99

Time: 9:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: G101/G102

Photo Direction: north



Date: 5/17/99

Time: 9:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: G101/G102

Photo Direction: west



Date: 5/17/99

Time: 11:30 am

Western Lion Landfill

ILSFNO507808

Sample Location: G103

Photo Direction: north



Date: 5/17/99

Time: 11:30 am

Western Lion Landfill

ILSFNO507808

Sample Location: G103

Photo Direction: west



Date: 5/17/99

Time: 10:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: G104

Photo Direction: north



Date: 5/17/99

Time: 10:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: G104

Photo Direction: west



Date: 5/17/99

Time: 12:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: G105

Photo Direction: north



Date: 5/17/99

Time: 12:00 am

Western Lion Landfill

ILSFNO507808

Sample Location: G105

Photo Direction: west



Non-responsive

Date: 5/18/99

Time: 1:45 pm

Western Lion Landfill

ILSFNO507808

Sample Location: X201

Photo Direction: west



Appendix F

US EPA Directives and Guidance for the Site Assessment Program

US EPA Directives and Guidance for the Site Assessment Program

The Integrated Assessment will be conducted to: 1) Collect data which would satisfy both site assessment and remedial program activities. This would incorporate hazardous waste, surface water, air, and groundwater concerns. 2) The objectives of the assessment are to determine whether time critical or non time critical removals are warranted and to determine whether the site is National Priorities List (NPL) caliber. If the determination is made that the site is NPL caliber, additional data will likely be needed to complete the assessment. A sampling plan to accommodate removal and site assessment needs, as well as initial remedial needs should be developed. 3) Determination of site sampling needs will be accomplished with an understanding to assure adequate data for the removal assessment and the preparation of the Hazard Ranking System (HRS) score as well as the need for possible initial sampling for the remedial investigation. Based on the preliminary HRS score and removal program information, the site will then either be designated as No Further Action (NFA), or carried forward as an NPL listing candidate. Sites that are designated NFA or deferred to other statutes are not candidates for an Integrated Assessment. 4) Upon completion of the data gathering, there will be a determination of whether the site should be forwarded within the Superfund process, either through the remedial or removal programs.

The initial assessment of a site as it enters the Superfund program within Region V will be conducted by either a Regional On-Scene Coordinator (OSC) and a Site Assessment Manager (SAM) or by State personnel. An OSC and a SAM will be assigned for all new sites entering the Regional Superfund program. If an emergency is found to occur, U.S. EPA or state emergency

removal staff will be immediately contacted for action. If the site needs further Superfund activities, a Site Assessment Team (SAT), comprised of the State, the SAM, the Remedial Project Manager (RPM), and an OSC will be formed. As necessary, additional data can be generated for the SAT to make a recommendation to the Regional Decision Team (RDT) for further possible action.

The Integrated Assessment will address all the data requirements of the revised HRS using field screening and NPL level Data Quality Objectives (DQO's) prior to data collection. It will also provide needed data in a format to support remedial investigation workplan development. Only sites that appear to score highly enough for NPL listing and that have not been deferred to another authority will receive an Integrated Assessment.

Appendix G

Analytical Results from IL EPA Collected Samples

See Volume 2